

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of :  
Tsutomu MINAMI et al. : Attn: BOX PCT  
Serial No. NEW : Docket No. 2001\_1284A  
Filed September 12, 2001 :

PRODUCTION METHOD OF PATTERN  
FILM-COATED ARTICLE AND  
PHOTOSENSITIVE COMPOSITION  
[Corresponding to PCT/JP00/09382  
Filed December 28, 2000]

PRELIMINARY AMENDMENT

Assistant Commissioner for Patents,  
Washington, DC 20231

Sir:

Please amend the above-identified application as follows:

IN THE SPECIFICATION

Page 1, after the title of the invention, please insert:

This application is a 371 application of PCT/JP00/09382 filed December 28, 2000.

IN THE CLAIMS

Please amend claims 3-10, 13-17, 23 and 26-27 as follows:

3. (Amended) The method of claim 1, wherein the hydrolyzable metal or silicon alkoxide includes a silicon alkoxide, a titanium alkoxide, a zirconium alkoxide or an aluminum alkoxide.

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4. (Amended) The method of claim 1, wherein the hydrolyzable metal or silicon alkoxide includes a silicon tetra- or tri-alkoxide, a titanium tetra- or tri-alkoxide, a zirconium tetra- or tri-alkoxide or an aluminum trialkoxide.

5. (Amended) The method of claim 1, wherein the hydrolyzable metal or silicon alkoxide includes at least one alkoxide selected from the group consisting of tetraethoxysilane, tetramethoxysilane, tributoxyaluminum, tetrapropoxyzirconium, tetrabutoxyzirconium, tetraisopropoxytitanium, tetrabutoxytitanium, methyltriethoxysilane, methyltrimethoxysilane, phenyltriethoxysilane and phenyltrimethoxysilane.

6. (Amended) The method of claim 1, wherein the photosensitive composition contains the hydrolyzable metal or silicon alkoxide in an amount of 1 to 50 parts by weight based on 100 parts by weight of the allyl group-containing metal or silicon alkoxide.

7. (Amended) The method of claim 1, wherein the photosensitive composition further contains a photoreaction initiator in a proportion of 0.001 to 0.2 moles per mole of the allyl group-containing metal or silicon alkoxide.

8. (Amended) The method of claim 1, wherein the photosensitive composition further contains a polymerization promoter in a proportion of 0.0005 to 0.1 mole per mole of the total of the metal or silicon alkoxide and the allyl group-containing metal or silicon alkoxide.

9. (Amended) The method of claim 1, wherein the photosensitive composition further contains water in a molar proportion which is 1 to 20 times as much as the total of the hydrolyzable metal or silicon alkoxide and the allyl group-containing metal or silicon alkoxide having photosensitivity.

10. (Amended) The method of claim 1, wherein the photosensitive composition contains 5 to 95.49% by weight of the allyl group-containing metal or silicon alkoxide, 1 to 50% by weight of the hydrolyzable metal or silicon alkoxide, 0.5 to 10% by weight of the photoreaction initiator, 0.01 to 10% by weight of the polymerization promoter, 0 to 50% by weight of a solvent and 3 to 50% by weight of water.

13. (Amended) The method of claim 11, wherein the photosensitive composition further contains a photoreaction initiator in a proportion of 0.001 to 0.2 moles per mole of the allyl group-containing trialkoxysilane.

14. (Amended) The method of claim 11, wherein the photosensitive composition further contains a polymerization promoter in a proportion of 0.0005 to 0.1 mole per mole of the allyl group-containing trialkoxysilane.

15. (Amended) The method of claim 11, wherein the photosensitive composition further contains water in a molar proportion which is 1 to 20 times as much as the allyl group-containing trialkoxysilane.

16. (Amended) The method of claim 11, wherein the photosensitive composition contains 5 to 96.49% by weight of the allyl group-containing trialkoxysilane, 0.5 to 10% by weight of the photoreaction initiator, 0.01 to 10% by weight of the polymerization promoter, 0 to 50% by weight of a solvent and 3 to 50% by weight of water.

17. (Amended) The method of claim 1, wherein the pattern film-coated article is an optical waveguide, diffraction grating or microlens.

23. (Amended) The photosensitive composition of claim 18, wherein the allyl group-containing metal or silicon alkoxide is allyltrialkoxysilane.

26. (Amended) The composition of claim 18, wherein the photosensitive composition contains 5 to 95.49% by weight of the allyl group-containing metal or silicon alkoxide, 1 to 50% by weight of the hydrolyzable metal or silicon alkoxide, 0.5 to 10% by weight of the photoreaction initiator, 0.01 to 10% by weight of the polymerization promoter, 0 to 50% by weight of a solvent and 3 to 50% by weight of water.

27. (Amended) The composition of claim 18, wherein the photosensitive composition further contains an acid catalyst in an amount of 0.00002 to 10% by weight.

Please add new claims 28-106 as follows:

28. (New) The method of claim 2, wherein the hydrolyzable metal or silicon alkoxide includes a silicon alkoxide, a titanium alkoxide, a zirconium alkoxide or an aluminum alkoxide.

29. (New) The method of claim 2, wherein the hydrolyzable metal or silicon alkoxide includes a silicon tetra- or tri-alkoxide, a titanium tetra- or tri-alkoxide, a zirconium tetra- or tri-alkoxide or an aluminum trialkoxide.

30. (New) The method of claim 3, wherein the hydrolyzable metal or silicon alkoxide includes a silicon tetra- or tri-alkoxide, a titanium tetra- or tri-alkoxide, a zirconium tetra- or tri-alkoxide or an aluminum trialkoxide.

31. (New) The method of claim 2, wherein the hydrolyzable metal or silicon alkoxide includes at least one alkoxide selected from the group consisting of tetraethoxysilane, tetramethoxysilane, tributoxyaluminum, tetrapropoxyzirconium, tetrabutoxyzirconium, tetraisopropoxytitanium, tetrabutoxytitanium, methyltriethoxysilane, methyltrimethoxysilane, phenyltriethoxysilane and phenyltrimethoxysilane.

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38. (New) The method of claim 2, wherein the photosensitive composition further contains a photoreaction initiator in a proportion of 0.001 to 0.2 moles per mole of the allyl group-containing metal or silicon alkoxide.

39. (New) The method of claim 3, wherein the photosensitive composition further contains a photoreaction initiator in a proportion of 0.001 to 0.2 moles per mole of the allyl group-containing metal or silicon alkoxide.

40. (New) The method of claim 4, wherein the photosensitive composition further contains a photoreaction initiator in a proportion of 0.001 to 0.2 moles per mole of the allyl group-containing metal or silicon alkoxide.

41. (New) The method of claim 5, wherein the photosensitive composition further contains a photoreaction initiator in a proportion of 0.001 to 0.2 moles per mole of the allyl group-containing metal or silicon alkoxide.

42. (New) The method of claim 6, wherein the photosensitive composition further contains a photoreaction initiator in a proportion of 0.001 to 0.2 moles per mole of the allyl group-containing metal or silicon alkoxide.

43. (New) The method of claim 2, wherein the photosensitive composition further contains a polymerization promoter in a proportion of 0.0005 to 0.1 mole per mole of the total of the metal or silicon alkoxide and the allyl group-containing metal or silicon alkoxide.

44. (New) The method of claim 3, wherein the photosensitive composition further contains a polymerization promoter in a proportion of 0.0005 to 0.1 mole per mole of the total of the metal or silicon alkoxide and the allyl group-containing metal or silicon alkoxide.

45. (New) The method of claim 4, wherein the photosensitive composition further contains a polymerization promoter in a proportion of 0.0005 to 0.1 mole per mole of the total of the metal or silicon alkoxide and the allyl group-containing metal or silicon alkoxide.

46. (New) The method of claim 5, wherein the photosensitive composition further contains a polymerization promoter in a proportion of 0.0005 to 0.1 mole per mole of the total of the metal or silicon alkoxide and the allyl group-containing metal or silicon alkoxide.

47. (New) The method of claim 6, wherein the photosensitive composition further contains a polymerization promoter in a proportion of 0.0005 to 0.1 mole per mole of the total of the metal or silicon alkoxide and the allyl group-containing metal or silicon alkoxide.

48. (New) The method of claim 7, wherein the photosensitive composition further contains a polymerization promoter in a proportion of 0.0005 to 0.1 mole per mole of the total of the metal or silicon alkoxide and the allyl group-containing metal or silicon alkoxide.

49. (New) The method of claim 2, wherein the photosensitive composition further contains water in a molar proportion which is 1 to 20 times as much as the total of the hydrolyzable metal or silicon alkoxide and the allyl group-containing metal or silicon alkoxide having photosensitivity.

50. (New) The method of claim 3, wherein the photosensitive composition further contains water in a molar proportion which is 1 to 20 times as much as the total of the hydrolyzable metal or silicon alkoxide and the allyl group-containing metal or silicon alkoxide having photosensitivity.

51. (New) The method of claim 4, wherein the photosensitive composition further contains water in a molar proportion which is 1 to 20 times as much as the total of the

hydrolyzable metal or silicon alkoxide and the allyl group-containing metal or silicon alkoxide having photosensitivity.

52. (New) The method of claim 5, wherein the photosensitive composition further contains water in a molar proportion which is 1 to 20 times as much as the total of the hydrolyzable metal or silicon alkoxide and the allyl group-containing metal or silicon alkoxide having photosensitivity.

53. (New) The method of claim 6, wherein the photosensitive composition further contains water in a molar proportion which is 1 to 20 times as much as the total of the hydrolyzable metal or silicon alkoxide and the allyl group-containing metal or silicon alkoxide having photosensitivity.

54. (New) The method of claim 7, wherein the photosensitive composition further contains water in a molar proportion which is 1 to 20 times as much as the total of the hydrolyzable metal or silicon alkoxide and the allyl group-containing metal or silicon alkoxide having photosensitivity.

55. (New) The method of claim 8, wherein the photosensitive composition further contains water in a molar proportion which is 1 to 20 times as much as the total of the hydrolyzable metal or silicon alkoxide and the allyl group-containing metal or silicon alkoxide having photosensitivity.

56. (New) The method of claim 2, wherein the photosensitive composition contains 5 to 95.49% by weight of the allyl group-containing metal or silicon alkoxide, 1 to 50% by weight of the hydrolyzable metal or silicon alkoxide, 0.5 to 10% by weight of the photoreaction initiator, 0.01 to 10% by weight of the polymerization promoter, 0 to 50% by weight of a solvent and 3 to 50% by weight of water.



57. (New) The method of claim 3, wherein the photosensitive composition contains 5 to 95.49% by weight of the allyl group-containing metal or silicon alkoxide, 1 to 50% by weight of the hydrolyzable metal or silicon alkoxide, 0.5 to 10% by weight of the photoreaction initiator, 0.01 to 10% by weight of the polymerization promoter, 0 to 50% by weight of a solvent and 3 to 50% by weight of water.

58. (New) The method of claim 4, wherein the photosensitive composition contains 5 to 95.49% by weight of the allyl group-containing metal or silicon alkoxide, 1 to 50% by weight of the hydrolyzable metal or silicon alkoxide, 0.5 to 10% by weight of the photoreaction initiator, 0.01 to 10% by weight of the polymerization promoter, 0 to 50% by weight of a solvent and 3 to 50% by weight of water.

59. (New) The method of claim 5, wherein the photosensitive composition contains 5 to 95.49% by weight of the allyl group-containing metal or silicon alkoxide, 1 to 50% by weight of the hydrolyzable metal or silicon alkoxide, 0.5 to 10% by weight of the photoreaction initiator, 0.01 to 10% by weight of the polymerization promoter, 0 to 50% by weight of a solvent and 3 to 50% by weight of water.

60. (New) The method of claim 6, wherein the photosensitive composition contains 5 to 95.49% by weight of the allyl group-containing metal or silicon alkoxide, 1 to 50% by weight of the hydrolyzable metal or silicon alkoxide, 0.5 to 10% by weight of the photoreaction initiator, 0.01 to 10% by weight of the polymerization promoter, 0 to 50% by weight of a solvent and 3 to 50% by weight of water.

61. (New) The method of claim 7, wherein the photosensitive composition contains 5 to 95.49% by weight of the allyl group-containing metal or silicon alkoxide, 1 to 50% by weight of the hydrolyzable metal or silicon alkoxide, 0.5 to 10% by weight of the photoreaction initiator,

0.01 to 10% by weight of the polymerization promoter, 0 to 50% by weight of a solvent and 3 to 50% by weight of water.

62. (New) The method of claim 8, wherein the photosensitive composition contains 5 to 95.49% by weight of the allyl group-containing metal or silicon alkoxide, 1 to 50% by weight of the hydrolyzable metal or silicon alkoxide, 0.5 to 10% by weight of the photoreaction initiator, 0.01 to 10% by weight of the polymerization promoter, 0 to 50% by weight of a solvent and 3 to 50% by weight of water.

63. (New) The method of claim 9, wherein the photosensitive composition contains 5 to 95.49% by weight of the allyl group-containing metal or silicon alkoxide, 1 to 50% by weight of the hydrolyzable metal or silicon alkoxide, 0.5 to 10% by weight of the photoreaction initiator, 0.01 to 10% by weight of the polymerization promoter, 0 to 50% by weight of a solvent and 3 to 50% by weight of water.

64. (New) The method of claim 12, wherein the photosensitive composition further contains a photoreaction initiator in a proportion of 0.001 to 0.2 moles per mole of the allyl group-containing trialkoxysilane.

65. (New) The method of claim 12, wherein the photosensitive composition further contains a polymerization promoter in a proportion of 0.0005 to 0.1 mole per mole of the allyl group-containing trialkoxysilane.

66. (New) The method of claim 13, wherein the photosensitive composition further contains a polymerization promoter in a proportion of 0.0005 to 0.1 mole per mole of the allyl group-containing trialkoxysilane.

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67. (New) The method of claim 12, wherein the photosensitive composition further contains water in a molar proportion which is 1 to 20 times as much as the allyl group-containing trialkoxysilane.

68. (New) The method of claim 13, wherein the photosensitive composition further contains water in a molar proportion which is 1 to 20 times as much as the allyl group-containing trialkoxysilane.

69. (New) The method of claim 14, wherein the photosensitive composition further contains water in a molar proportion which is 1 to 20 times as much as the allyl group-containing trialkoxysilane.

70. (New) The method of claim 12, wherein the photosensitive composition contains 5 to 96.49% by weight of the allyl group-containing trialkoxysilane, 0.5 to 10% by weight of the photoreaction initiator, 0.01 to 10% by weight of the polymerization promoter, 0 to 50% by weight of a solvent and 3 to 50% by weight of water.

71. (New) The method of claim 13, wherein the photosensitive composition contains 5 to 96.49% by weight of the allyl group-containing trialkoxysilane, 0.5 to 10% by weight of the photoreaction initiator, 0.01 to 10% by weight of the polymerization promoter, 0 to 50% by weight of a solvent and 3 to 50% by weight of water.

72. (New) The method of claim 14, wherein the photosensitive composition contains 5 to 96.49% by weight of the allyl group-containing trialkoxysilane, 0.5 to 10% by weight of the photoreaction initiator, 0.01 to 10% by weight of the polymerization promoter, 0 to 50% by weight of a solvent and 3 to 50% by weight of water.

73. (New) The method of claim 15, wherein the photosensitive composition contains 5 to 96.49% by weight of the allyl group-containing trialkoxysilane, 0.5 to 10% by weight of the photoreaction initiator, 0.01 to 10% by weight of the polymerization promoter, 0 to 50% by weight of a solvent and 3 to 50% by weight of water.

74. (New) The method of claim 2, wherein the pattern film-coated article is an optical waveguide, diffraction grating or microlens.

75. (New) The method of claim 3, wherein the pattern film-coated article is an optical waveguide, diffraction grating or microlens.

76. (New) The method of claim 4, wherein the pattern film-coated article is an optical waveguide, diffraction grating or microlens.

77. (New) The method of claim 5, wherein the pattern film-coated article is an optical waveguide, diffraction grating or microlens.

78. (New) The method of claim 6, wherein the pattern film-coated article is an optical waveguide, diffraction grating or microlens.

79. (New) The method of claim 7, wherein the pattern film-coated article is an optical waveguide, diffraction grating or microlens.

80. (New) The method of claim 8, wherein the pattern film-coated article is an optical waveguide, diffraction grating or microlens.

81. (New) The method of claim 9, wherein the pattern film-coated article is an optical waveguide, diffraction grating or microlens.

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82. (New) The method of claim 10, wherein the pattern film-coated article is an optical waveguide, diffraction grating or microlens.

83. (New) The method of claim 11, wherein the pattern film-coated article is an optical waveguide, diffraction grating or microlens.

84. (New) The method of claim 12, wherein the pattern film-coated article is an optical waveguide, diffraction grating or microlens.

85. (New) The method of claim 13, wherein the pattern film-coated article is an optical waveguide, diffraction grating or microlens.

86. (New) The method of claim 14, wherein the pattern film-coated article is an optical waveguide, diffraction grating or microlens.

87. (New) The method of claim 15, wherein the pattern film-coated article is an optical waveguide, diffraction grating or microlens.

88. (New) The method of claim 16, wherein the pattern film-coated article is an optical waveguide, diffraction grating or microlens.

89. (New) The photosensitive composition of claim 19, wherein the allyl group-containing metal or silicon alkoxide is allyltrialkoxysilane.

90. (New) The photosensitive composition of claim 20, wherein the allyl group-containing metal or silicon alkoxide is allyltrialkoxysilane.

91. (New) The photosensitive composition of claim 21, wherein the allyl group-containing metal or silicon alkoxide is allyltrialkoxysilane.

92. (New) The photosensitive composition of claim 22, wherein the allyl group-containing metal or silicon alkoxide is allyltrialkoxysilane.

93. (New) The composition of claim 19, wherein the photosensitive composition contains 5 to 95.49% by weight of the allyl group-containing metal or silicon alkoxide, 1 to 50% by weight of the hydrolyzable metal or silicon alkoxide, 0.5 to 10% by weight of the photoreaction initiator, 0.01 to 10% by weight of the polymerization promoter, 0 to 50% by weight of a solvent and 3 to 50% by weight of water.

94. (New) The composition of claim 20, wherein the photosensitive composition contains 5 to 95.49% by weight of the allyl group-containing metal or silicon alkoxide, 1 to 50% by weight of the hydrolyzable metal or silicon alkoxide, 0.5 to 10% by weight of the photoreaction initiator, 0.01 to 10% by weight of the polymerization promoter, 0 to 50% by weight of a solvent and 3 to 50% by weight of water.

95. (New) The composition of claim 21, wherein the photosensitive composition contains 5 to 95.49% by weight of the allyl group-containing metal or silicon alkoxide, 1 to 50% by weight of the hydrolyzable metal or silicon alkoxide, 0.5 to 10% by weight of the photoreaction initiator, 0.01 to 10% by weight of the polymerization promoter, 0 to 50% by weight of a solvent and 3 to 50% by weight of water.

96. (New) The composition of claim 22, wherein the photosensitive composition contains 5 to 95.49% by weight of the allyl group-containing metal or silicon alkoxide, 1 to 50% by weight of the hydrolyzable metal or silicon alkoxide, 0.5 to 10% by weight of the photoreaction initiator,

0.01 to 10% by weight of the polymerization promoter, 0 to 50% by weight of a solvent and 3 to 50% by weight of water.

97. (New) The composition of claim 23, wherein the photosensitive composition contains 5 to 95.49% by weight of the allyl group-containing metal or silicon alkoxide, 1 to 50% by weight of the hydrolyzable metal or silicon alkoxide, 0.5 to 10% by weight of the photoreaction initiator, 0.01 to 10% by weight of the polymerization promoter, 0 to 50% by weight of a solvent and 3 to 50% by weight of water.

98. (New) The composition of claim 24, wherein the photosensitive composition contains 5 to 95.49% by weight of the allyl group-containing metal or silicon alkoxide, 1 to 50% by weight of the hydrolyzable metal or silicon alkoxide, 0.5 to 10% by weight of the photoreaction initiator, 0.01 to 10% by weight of the polymerization promoter, 0 to 50% by weight of a solvent and 3 to 50% by weight of water.

99. (New) The composition of claim 19, wherein the photosensitive composition further contains an acid catalyst in an amount of 0.00002 to 10% by weight.

100. (New) The composition of claim 20, wherein the photosensitive composition further contains an acid catalyst in an amount of 0.00002 to 10% by weight.

101. (New) The composition of claim 21, wherein the photosensitive composition further contains an acid catalyst in an amount of 0.00002 to 10% by weight.

102. (New) The composition of claim 22, wherein the photosensitive composition further contains an acid catalyst in an amount of 0.00002 to 10% by weight.

103. (New) The composition of claim 23, wherein the photosensitive composition further contains an acid catalyst in an amount of 0.00002 to 10% by weight.

104. (New) The composition of claim 24, wherein the photosensitive composition further contains an acid catalyst in an amount of 0.00002 to 10% by weight.

105. (New) The composition of claim 25, wherein the photosensitive composition further contains an acid catalyst in an amount of 0.00002 to 10% by weight.

106. (New) The composition of claim 26, wherein the photosensitive composition further contains an acid catalyst in an amount of 0.00002 to 10% by weight.

#### REMARKS

The specification has been amended to insert a cross-reference to the International Application.

The claims have been amended to avoid their improper multiple dependency, and also to avoid the multiple dependent claim fee, as a result of which new claims 28-106 have been added to the application.

Attached hereto is a marked-up version of the changes made to the claims by the current amendment. The attached page is captioned "Version with markings to show changes made."

Respectfully submitted,

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CLAIMS

1. A method for producing a pattern film-coated article which comprises the steps of coating a photosensitive composition comprising an organometallic or organosilicon compound having photosensitivity and a hydrolyzable metal or silicon alkoxide on a substrate, irradiating the coated film on the substrate with light to polymerize the exposed portions of the coated film and then dissolving unexposed portions of the coated film to remove them, wherein the organometallic or organosilicon compound is an allyl group-containing metal or silicon alkoxide.
2. The method of claim 1, wherein the allyl group-containing metal or silicon alkoxide is allyltrimethoxysilane or allyltriethoxysilane.
3. The method of claim 1 ~~or 2~~, wherein the hydrolyzable metal or silicon alkoxide includes a silicon alkoxide, a titanium alkoxide, a zirconium alkoxide or an aluminum alkoxide.
4. The method of ~~any one of claims 1 to 3~~, wherein the hydrolyzable metal or silicon alkoxide includes a silicon tetra- or tri-alkoxide, a titanium tetra- or tri-alkoxide, a zirconium tetra- or tri-alkoxide or an aluminum trialkoxide.
5. The method of ~~any one of claims 1 to 4~~, wherein the hydrolyzable metal or silicon alkoxide includes at least one alkoxide selected from the group consisting of tetraethoxysilane, tetramethoxysilane, tributoxyaluminum, tetrapropoxyzirconium, tetrabutoxyzirconium, tetraisopropoxytitanium, tetrabutoxytitanium,

methyltriethoxysilane, methyltrimethoxysilane,  
phenyltriethoxysilane and phenyltrimethoxysilane.

6. The method of ~~any one of claims 1 to 5~~, wherein the  
5 photosensitive composition contains the hydrolyzable metal  
or silicon alkoxide in an amount of 1 to 50 parts by weight  
based on 100 parts by weight of the allyl group-containing  
metal or silicon alkoxide.
- 10 7. The method of ~~any one of claims 1 to 6~~, wherein the  
photosensitive composition further contains a photoreaction  
initiator in a proportion of 0.001 to 0.2 moles per mole of  
the allyl group-containing metal or silicon alkoxide.
- 15 8. The method of ~~any one of claims 1 to 7~~, wherein the  
photosensitive composition further contains a  
polymerization promoter in a proportion of 0.0005 to 0.1 mole  
per mole of the total of the metal or silicon alkoxide and  
the allyl group-containing metal or silicon alkoxide.
- 20 9. The method of ~~any one of claims 1 to 8~~, wherein the  
photosensitive composition further contains water in a molar  
proportion which is 1 to 20 times as much as the total of  
the hydrolyzable metal or silicon alkoxide and the allyl  
25 group-containing metal or silicon alkoxide having  
photosensitivity.
- 30 10. The method of ~~any one of claims 1 to 9~~, wherein the  
photosensitive composition contains 5 to 95.49% by weight  
of the allyl group-containing metal or silicon alkoxide, 1  
to 50% by weight of the hydrolyzable metal or silicon alkoxide,  
0.5 to 10% by weight of the photoreaction initiator, 0.01  
to 10% by weight of the polymerization promoter, 0 to 50%  
by weight of a solvent and 3 to 50% by weight of water.

11. A method for producing a pattern film-coated article which comprises the steps of coating a photosensitive composition containing an allyl group-containing  
5 trialkoxysilane on a substrate, irradiating the coated film on the substrate with light to polymerize the exposed portions of the coated film and then dissolving unexposed portions of the coated film to remove them.
- 10 12. The method of claim 11, wherein the allyl group-containing trialkoxysilane is allyltrimethoxysilane or allyltriethoxysilane.
- 15 13. The method of claim ~~11 or 12~~, wherein the photosensitive composition further contains a photoreaction initiator in a proportion of 0.001 to 0.2 moles per mole of the allyl group-containing trialkoxysilane.
- 20 14. The method of ~~any one of claims 11 to 13~~, wherein the photosensitive composition further contains a polymerization promoter in a proportion of 0.0005 to 0.1 mole per mole of the allyl group-containing trialkoxysilane.
- 25 15. The method of ~~any one of claims 11 to 14~~, wherein the photosensitive composition further contains water in a molar proportion which is 1 to 20 times as much as the allyl group-containing trialkoxysilane.
- 30 16. The method of ~~any one of claims 11 to 15~~, wherein the photosensitive composition contains 5 to 96.49% by weight of the allyl group-containing trialkoxysilane, 0.5 to 10% by weight of the photoreaction initiator, 0.01 to 10% by weight of the polymerization promoter, 0 to 50% by weight of a solvent and 3 to 50% by weight of water.

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17. The method of ~~any one of claims 1 to 16~~, wherein the pattern film-coated article is an optical waveguide, diffraction grating or microlens.

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18. A photosensitive composition comprising an allyl group-containing metal or silicon alkoxide, a photoreaction initiator, a polymerization promoter and water as main components.

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19. The photosensitive composition of claim 18, which further contains a hydrolyzable metal or silicon alkoxide.

20. The photosensitive composition of claim 19, wherein the hydrolyzable metal or silicon alkoxide includes a silicon alkoxide, a titanium alkoxide, a zirconium alkoxide or an aluminum alkoxide.

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21. The photosensitive composition of claims 19, wherein the hydrolyzable metal alkoxide includes a silicon tetra- or tri-alkoxide, a titanium tetra- or tri-alkoxide, a zirconium tetra- or tri-alkoxide or an aluminum trialkoxide.

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22. The photosensitive composition of claims 19, wherein the hydrolyzable metal or silicon alkoxide includes at least one alkoxide selected from the group consisting of tetraethoxysilane, tetramethoxysilane, tributoxyaluminum, tetrapropoxyzirconium, tetrabutoxyzirconium, tetraisopropoxytitanium, tetrabutoxytitanium, methyltriethoxysilane, methyltrimethoxysilane, phenyltriethoxysilane and phenyltrimethoxysilane.

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23. The photosensitive composition of ~~any one of claims 18 to 22~~, wherein the allyl group-containing metal or silicon

alkoxide is allyltrialkoxysilane.

24. The photosensitive composition of claim 23, wherein the allyltrialkoxysilane is allyltrimethoxysilane or allyltriethoxysilane.

25. The composition of claim 23, wherein the photosensitive composition contains 5 to 96.49% by weight of allyltrialkoxysilane, 0.5 to 10% by weight of the photoreaction initiator, 0.01 to 10% by weight of the polymerization promoter, 0 to 50% by weight of a solvent and 3 to 30% by weight of water.

26. The composition of ~~any one of claims 18 to 24~~, wherein the photosensitive composition contains 5 to 95.49% by weight of the allyl group-containing metal or silicon alkoxide, 1 to 50% by weight of the hydrolyzable metal or silicon alkoxide, 0.5 to 10% by weight of the photoreaction initiator, 0.01 to 10% by weight of the polymerization promoter, 0 to 50% by weight of a solvent and 3 to 50% by weight of water.

27. The composition of ~~any one of claims 18 to 26~~, wherein the photosensitive composition further contains an acid catalyst in an amount of 0.00002 to 10% by weight.